

## METHOD 7610

### POTASSIUM (ATOMIC ABSORPTION, DIRECT ASPIRATION)

#### 1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

#### 2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

#### 3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 In air/acetylene or other high-temperature flames ( $>2800^{\circ}\text{C}$ ), potassium can experience partial ionization, which indirectly affects absorption sensitivity. The presence of other alkali salts in the sample can reduce this ionization and thereby enhance analytical results. The ionization-suppressive effect of sodium is small if the ratio of Na to K is under 10. Any enhancement due to sodium can be stabilized by adding excess sodium (1,000 ug/mL) to both sample and standard solutions. If more stringent control of ionization is required, the addition of cesium should be considered. Reagent blanks should be analyzed to correct for potassium impurities in the buffer stock.

#### 4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 Potassium hollow cathode lamp.

4.2.2 Wavelength: 766.5 nm.

4.2.3 Fuel: Acetylene.

4.2.4 Oxidant: Air.

4.2.5 Type of flame: Slightly oxidizing (fuel lean).

4.2.6 Background correction: Not required.

#### 5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.

## 5.2 Preparation of standards:

5.2.1 **Stock solution:** Dissolve 1.907 g of potassium chloride, KCl (analytical reagent grade), dried at 110°C in Type II water and dilute to 1 liter with Type II water. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentration as will result in the sample to be analyzed after processing.

## 6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

## 7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Chapter Three, Section 3.2.

7.2 See Method 7000, Paragraph 7.2, Direct Aspiration.

## 8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

## 9.0 METHOD PERFORMANCE

9.1 The performance characteristics for an aqueous sample free of interferences are:

Optimum concentration range: 0.1-2 mg/L with a wavelength of 766.5 nm.

Sensitivity: 0.04 mg/L.

Detection limit: 0.01 mg/L.

9.2 In a single laboratory, analysis of a mixed industrial-domestic waste effluent, digested with Method 3010, at concentrations of 1.6 and 6.3 mg/L gave standard deviations of  $\pm 0.2$  and  $\pm 0.5$ , respectively. Recoveries at these levels were 103% and 102%, respectively.

## 10.0 REFERENCES

1. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-82-055, December 1982, Method 258.1.

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